

FINAL REPORT 2010

2010 Soybean Integrated Pest and Crop Management On-Farm Educational Programs in New York

Project Leaders:

Kenneth Wise, Eastern NY Area IPM Educator, Livestock / Field Crops, NYS IPM Program
J. Keith Waldron, NYS IPM Livestock / Field Crops Coordinator, NYS IPM Program

Cooperators:

Janice Degni, South Central NY Dairy & Field Crops Team
Kevin Ganoe, Central NY Dairy and Field Crops Team
Mike Stanyard, NWN Y Dairy and Field Crops Team
James Kingston, NWN Y Dairy and Field Crops Team
Stephen Canner, Cornell Cooperative Extension, St. Lawrence and Franklin Counties
Jonathan Schell, Cornell Cooperative Extension, Oswego County
Keith Severson, Cornell Cooperative Extension, Cayuga County

Abstract:

In 2010, 38 participants representing 33 farms in 6 counties in New York State participated in on-farm soybean Tactical Agriculture (TAg) team Integrated Pest Management (IPM) programs. Participants were actively engaged in a growing-season-long educational program discussing critical pest and crop management topics arising during the growing season. Multiple educational meetings were held in farmer fields enhancing opportunities to reinforce use of IPM concepts and techniques. Participating producers benefited from the timely collection of data from their fields throughout the growing season. The pest information gathered from scouting these soybean fields during the growing season was used in other extension educational efforts across New York State. Many growers were encouraged to spray fungicides by commercial field sales people without the presence of disease as a way to increase yield. From past research conducted by the NYS IPM program and a few TAg producers found this not to be the case. Each grower was able to save money from not spraying their soybean fields. Soybean aphids were also found at very low levels with scouting activities on the farms. No TAg producers had to spray for aphids this past growing season also saving them on the cost of production.

In addition to the traditional soybean TAg efforts, one-time IPM and Integrated Crop Management (ICM) soybean meetings were held in Cayuga, Cortland, Oswego, St. Lawrence and Franklin counties. These field meetings extended the reach of soybean IPM and ICM on-farm education beyond the more intensive TAg groups to target soybean producers in areas where soybean acreage is expanding. Seventy producers attended these meetings.

Background and Justification:

Sound crop and pest management is critical to economical and efficient field crop production in New York State. The diverse landscape of New York State provides a variety of environmental conditions that can present unique crop production and pest management challenges while providing opportunities for locally based and locally adapted Integrated Pest Management (IPM) and Integrated Crop Management (ICM) training. Many agricultural producers have indicated they would like to learn more about Integrated Crop and Pest Management as a way to increase

profits while protecting the environment. The Tactical Agriculture program (TAg) was initiated in the early 1990s to help field corn and alfalfa producers learn how to improve their crop and pest management. TAg is an intensive, on-farm, growing-season-long, educational program that brings together Cooperative Extension educators, field crop producers, and agribusiness personnel to teach, learn, and implement IPM and ICM practices. An experiential, hands-on educational philosophy is the foundation of the TAg program approach. TAg builds on the philosophy that a participant learning a new IPM or ICM tactic by hearing, demonstrating, discussing, and practicing new concepts will more likely retain the information and adopt the practice, especially when the information is reinforced throughout the growing season.

A soybean TAg team typically consists of 4 to 8 producers and agribusiness personnel from a local area. TAg groups are comprised of farming neighbors who meet at a participant's farm to learn, discuss, demonstrate and practice the IPM and ICM methods. Meetings are scheduled approximately once a month to capitalize on the educational and management opportunities of the growing season. Participants are encouraged to be proactive and learn the IPM decision-making process. Many IPM options are presented, and participants are taught how to assess pest levels, and how to evaluate need, timing, and effectiveness of various management interventions. Thus, they can more effectively manage situations in real time during the growing season when the pest or crop issues are occurring. Producers are encouraged to consider and use non-pesticide options but to also include judicious use of chemical control tactics when appropriate. Each TAg participant brings his or her own experience and expertise, which enriches discussion and contribute to the groups' overall learning process. TAg participants enroll 1 field of soybeans which serve as classrooms for TAg meetings.

On-farm education has been shown to increase participation and rates of adoption of new concepts and technologies (Wuest et al. 1995; Flora 1991). On-farm TAg meetings provide an ideal opportunity for producers to directly observe disease, insect, and weed issues. The on-farm setting fulfills a producer's desire to see how an IPM and ICM method or new technology might work on his or her own farm. The small group educational design promotes learning and effective communication among TAg participants and Extension facilitators. Participants learn from each other what agronomic methods might work on their farm given their unique crops, soils, equipment, management, and other individual farm strengths and constraints. Trust is gained among farmer, extension, and agribusiness participants. In addition to presenting a core set of IPM and ICM topics, the flexible nature of TAg programs allows facilitators to address unique situations or local concerns. Adapting TAg programs to meet local needs has great potential to dramatically increase the rate of adoption of IPM and ICM practices. For more information on this approach, please visit the following section of the NYS IPM website: <http://nysipm.cornell.edu/fieldcrops/tag/default.asp>

Needs of agricultural producers constantly change. For many producers, soybeans fit well with their field crop rotations, provide a useful homegrown source of livestock feed, and offer a valuable cash crop option. In New York State, soybean acreage has increased 10-fold plus since 1986. The USDA National Agriculture Statistics Service estimated in November of 2010 that 282,000 acres of soybeans would be harvested in 2010 in NY, the largest acreage on record. From 2007 to 2010 there was an increase of 30% in the number of soybean acres harvested in New York State. The trend in soybean acreage expansion is expected to continue as local

markets are enhanced by availability of commercial roasters and oil processing plants, favorable yield potential and commodity prices, and a continued increase in interest in production and marketing of soy biodiesel. As soybean acreage has increased, so have producer questions regarding crop protection.

Until recently, soybean pest concerns have been minimal in the northeast, generally restricted to weeds, and minor insect, disease and vertebrate pests affecting emergence, vegetative and reproductive phases of crop development. Given our Northeastern pest spectrum, many pest impacts have largely been minimized or avoided through an integrated approach based on selecting varieties for maturity group, disease resistance, and commercial commodity attributes and the timely implementation of sound agronomic practices including crop rotation. Regular field monitoring for pests and crop condition is encouraged to alert producers of potential problems.

With the detection of soybean rust in the southeastern US in November of 2004, many experts speculated that rust could have a substantial impact on soybean pest management in the future. In response, producers anticipated a need to be proactive in learning how to manage the problem should rust appear in New York. A season-long on-farm soybean education program is playing a major role in effectively communicating with farmers about Asian soybean rust identification and management, and the associated surge in interest and awareness of other foliar diseases. In addition, soybean aphid, a pest that was first documented in New York in 2001, has also dramatically increased the need for sound IPM education for soybean producers.

Weed management in soybeans will continue to be an important area for educating producers. While initially intended to be used occasionally to clean up weeds from problem fields, estimates from field crop extension educators indicate as much as 90 % of soybeans planted are glyphosphate herbicide resistant (Roundup Ready) varieties. This management technique appears to work adequately in most cases, but it is essential for IPM educators to be proactive in keeping soybean farmers alert about the potential risk of developing herbicide resistance, importance in correct timing of application, shifts in weed species occurrence, and the role that other glyphosphate-resistant crops (field corn and alfalfa) play in the use of this technology. Common lambsquarter that appears to tolerate normal rates of glyphosphate if not applied at the correct growth stage are becoming a larger concern to soybean farmers across NY. With two new exotic pests, numerous other occasionally severe pests, as well as increasing weed management challenges, it is crucial to use an educational delivery method that Cooperative Extension and other personnel can easily use in IPM outreach in soybean production systems.

Soybean producers in Orleans, Livingston, Herkimer, Chenango & Montgomery/Schoharie Counties were targeted for participation in intensive Soybean TAg training programs this season. In addition to these traditional TAg efforts, one-time IPM and Integrated Crop Management (ICM) soybean grower meetings were held in Cayuga, Cortland, Oswego, St. Lawrence and Franklin counties.

Objectives:

- 1) Conduct on-farm “traditional” TAg season-long integrated pest management (IPM) and integrated crop management (ICM) education programs for soybean producers across New York State. Discuss key agronomic and economic aspects of soybean production in New York State, with an emphasis on the identification, biology, and management of critical pests, including Asian soybean rust and soybean aphid.
- 2) Extend the reach of soybean IPM and ICM on-farm education beyond the season-long groups to more effectively target farmers in areas to which soybean production is expanding, by offering soybean producer “one time” meetings group field meetings.
- 3) Evaluate the impact of the education programs by measuring the level of adoption of IPM and ICM practices by participating soybean farmers.

Procedures:

Traditional TAg Educational Design:

Soybean on-farm TAg education programs were implemented in 6 counties in 2010. Each county identified key IPM and ICM educational needs based on initial meetings with the farmers who chose to participate. Local educators organized and held timely meetings to address the identified topics. Meetings were scheduled relative to the pest-related needs and opportunities identified. Meetings were held to provide relevant teaching in critical educational moments during the growing season. Mike Stanyard and James Kingston established two soybean TAg teams in Orleans and Livingston Counties. Kevin Ganoe coordinated three soybean TAg team teams in Herkimer, Montgomery/Schoharie and Chenango County. Table 1 summarizes the number of farms, coordinating Cornell Cooperative Extension Educators, and acres targeted. Table 2 presents the range of topics offered during 2010 for the traditional locally-adapted soybean TAg meetings.

Table 1. Description of Soybean TAg Teams in 2010. Number of farms and soybean acreage impacted by participating county programs

County	Local CCE TAg Team Coordinator	Number of Farms	Number of Team Members	Approximate number of Soybean Acres Targeted
Livingston	Michael Stanyard/ James Kingston	7	10	4555
Orleans	Michael Stanyard	12	14	4350
Herkimer	Kevin Ganoe	4	4	270
Montgomery/Schoharie	Kevin Ganoe	8	8	1760
Chenango	Kevin Ganoe	4	4	280
Totals:		33	38	11215

Table 2. Soybean TAg Topics. Overview of topics covered at Soybean TAg meetings.

Meeting Time	Topics Taught
June	Soybean stages of growth, plant population assessment - stand counts, seed corn maggot, slugs, early season disease pests: seedling rots and blights, soybean aphids, weed identification and management
July	Soybean stages of growth, soybean aphid identification and management,

	progress of on-farm demonstrations, soybean rust and other foliar diseases (Septoria brown spot, downy mildew), white mold, considerations regarding fungicide-use decisions
August	Soybean stages of growth, defoliating insects, soybean rust update, weed identification and management, white mold, farm-by-farm season-long pest management review, progress of on-farm demonstrations
September	Management of pests of stored soybeans, soybean harvest issues, planning for next year's crop: crop rotation, variety selection and seed treatment options; summary of on-farm demonstration observations so far

Field Scouting: Extension summer assistants monitored the enrolled soybean fields weekly on each participating farms. Obtaining field observations at regular intervals helped reinforce the value of timely scouting and the application of this approach to all soybean acreage in production. Field scouting documented crop growth and condition and pest status. Scouting reports were shared with producers weekly, and collected field data was used as a basis for discussion at each TAG team meeting. Experience has shown an “educational moment” value when producers analyze *real* pest and crop management data collected on their *own* farm. The analysis of timely field information more fully engages participants in the learning and decision making process. This approach is ultimately more convincing and effective at promoting behavioral changes than using hypothetical examples. As a result producers learn more and are more likely to adopt IPM and ICM practices.

Soybean producer “one time” group field meetings.

This season we again offered a series of complementary “one-time” soybean educational meetings to provide soybean IPM training opportunities for growers not enrolled in Traditional Soybean TAG programs. Local extension educators coordinated several one-time field meetings to educate soybean producers in IPM and ICM concepts. Although these meetings did not have the advantage of a full season TAG training, the format was very similar to a typical TAG team agenda.

Each meeting was held in the field and featured training in how to identify, monitor and evaluate common pest and crop problems. Fields were evaluated for crop growth and development and examined for presence of diseases, weeds, and insects. Suggested field monitoring and record keeping forms and other resources were shared with participants. These trainings prepared soybean producers with information and enhanced skills to conduct their own scouting. These meetings were offered in Cortland, St. Lawrence, Franklin, Oswego, and Cayuga counties. Seventy growers participated in these soybean IPM meetings. See table 2 for an overview of topics taught at particular times during the growing season.

Evaluation of the Program:

TAG participants were asked to complete a pre-test and a post-test to document a baseline of participant's IPM / ICM knowledge and skill level prior to program participation, to assess changes resulting from involvement with the TAG program, and to identify subject areas requiring special attention. A post-season survey was also conducted to determine how many

IPM or ICM practices participants planned to continue doing, on how many acres, and participants' suggestions for improving IPM and ICM education efforts in their county.

Results and Discussion:

Two types of soybean educational programs were conducted this season in NY: the traditional soybean TAg program and one-time soybean producer field meetings.

Traditional Soybean Tactical Agriculture teams (TAg).

The Tactical Agriculture (TAg) program has been a model for IPM and ICM information transfer in New York State for over 20 years. Five soybean TAg team programs were successfully implemented in 2010. Participants learned how to correctly identify, sample, assess, and apply different management tools on potential soybean pests including insects, weeds and diseases. They also gained the self-confidence needed to make environmentally and economically sound pest management decisions on their own.

Knowledge and Adoption of IPM and ICM:

Results of the pre and post-testing indicated that TAg participants all increased their knowledge of IPM and ICM. Scores on soybean pre-tests averaged 56%. At the completion of the program, participants' scores greatly increased to an average of 76%. Mean scores on pre and post tests are presented by team in Table 3.

Table 3. Pre and Post Test Scores. Mean scores on pre and post tests by county program

County	Mean Pre-test Score (%)	Mean Post-test Score (%)	Percent Improvement
Livingston	60	85	25
Orleans	58	78	20
Herkimer, Montgomery, Schoharie, Chenango	66	81	15
Overall	61	81	20

IMPACTS:

There were three main impacts from this year's TAg program to date: proper fungicide use, scouting for soybean aphids and row spacing/white mold.

Fungicide use to protect crop yields has been a topic of many TAg team discussions. How does one assess the value and economic benefit of fungicide use? Land grant research has shown a lack of economic benefit to applying fungicides to soybeans when there were *no diseases present*. The issue of using fungicides was discussed with TAg Team members and participants were trained in methods to identify and assess potential soybean diseases at critical times. Through these efforts, TAg participants were able to assess potential disease risk resulting in very judicious use of fungicides. The total potential savings for not spraying fungicides (\$30.00/acre) is \$336,450 across all TAg Team soybean acreage.

Soybean aphid populations were exceptionally low this season, well below the 250 aphids per plant action threshold. This observation is consistent from reports from across the state prompting an educational moment about the value of crop monitoring to eliminate unnecessary

use of insecticides and protection of natural enemies. Most program participants alerted to the low soybean aphids saved money, protected natural enemies and lessened risk of developing insecticide resistance by not unnecessarily treating fields with a soybean aphid insecticide.

White mold is a potentially devastating disease of soybeans and once a field is infested, this disease can persist for numerous years potentially affecting subsequent soybean rotations. Row spacing and white mold were major issues with the Herkimer, Chenango and Montgomery/Schoharie Counties TAG teams this season. Fields with more narrow row spacing (were 7.5 to 15 inch rows) were observed to have a higher risk of white mold incidence than those planted to 30-inch rows. This prompted major discussions about row spacing and plant populations. Kevin Ganoë was able to use a lot of good research based information on row spacing and plant populations that would reduce risk of this disease by reducing environmental conditions favorable to disease development, i.e. allowing improved air movement under the canopy. When the vegetation is too dense the level of moisture increases under the canopy and increases the risk of white mold.

Impacts of the one-time soybean pest and crop management meetings

Participants in the one-time soybean meetings were asked to complete an evaluation providing feedback on meeting content and suggestions for future topics. Information from these educational events has proven positive. When participants were asked to assess their pre- and post-meeting knowledge (1 = low, 5 = high) on various soybean topics their responses indicated noticeable improvement (See table 4).

Table 4: Pre/Post survey feedback from soybean educational event.

Level of understanding regarding:	Before: Mean Response	After: Mean Response
Soybean aphid	2.75	3.25
Diseases of Soybean	2.5	3.25
Fungicide use decision-making	2	3
Soybean growth stages	2.6	3.25
Use of economic thresholds	2.1	3

One-time meetings had an additional benefit of stimulating local interest in more in depth soybean IPM training.

Summary: The soybean TAG programs in Orleans, Livingston, Herkimer, Chenango & Montgomery/Schoharie Counties in 2010 were successful at helping 38 participants representing 33 farms to learn and to implement IPM and ICM philosophy and practices on the 11,215 acres of soybeans that they manage in their farming operations. Growers greatly appreciate the interactive and participatory learning approach of this educational program that is personalized to their specific farming environment. Year after year growers indicate their receptiveness to the on-farm season-long TAG approach to soybean IPM education. They have implemented many of the IPM and ICM practices taught in the TAG programs. This has resulted in an increase in knowledge and awareness of good soybean management practices implemented on the farm. They understand the importance of scouting fields and evaluating thresholds on certain pests of

soybeans. Producers in NYS continue to express interest joining a TAg team or attend meetings on soybean IPM and ICM. Continuation of the soybean on-farm education programs will enhance soybean IPM implementation efforts in NY and will improve the exchange of information between producers and extension personnel.

It should be duly noted that the successes gained through implementation of the soybean TAg efforts greatly reflect the active participation, dedication and hard work of the local cooperative extension educator facilitator(s) and their summer assistants.

Funding:

This project was supported by generous and continued funding from the Northeast Soybean Promotion Board.

References:

Flora, B. F. 1991. Research Priorities for Sustainable Agriculture. Conference proceedings: Setting Priorities: Research, Practice and Policy for a More Sustainable Agriculture. Leopold Center for Sustainable Agriculture.

New York Agricultural Statistics Annual Bulletin. 2010. New York Agricultural Statistics Service. U.S. Department of Agriculture.

Wuest , S. B., Guy, S. O., Smith L. J. and Miller, B. C. 1995. On-Farm Tests as a Tool for Extension Programming. Journal of Extension 33: 4.